SPECTROSCOPY OF DYSPROSIUM-DOPED HEAVY METAL GLASSES CONTAINING METALLIC NANOPARTICLES, Stewart K. Ferrell, Hyung K. Kim, P. K. Babu, Saisudha B. Mallur*, and Mark S. Boley, Department of Physics, Western Illinois University, Macomb, IL 61455, mfmsb@wiu.edu

The importance of heavy metal oxide glasses doped with rare earth ions (RE) as possible lasing materials has created considerable interest in these systems. These glasses have potential applications to several technological uses such as lasers and solar energy concentrators, because of their high refractive indices (1.8-2.2), large transmission window (400-4500 nm) and low phonon cutoff energies ($700cm^{-1}$), large non-linear response, and high chemical durability and thermal stability. We prepared samples of bismuth borate glasses doped with dysprosium using the usual melt-quench method. We also included three different precursor materials for creating nanoparticles (NPs) of Ag, CdSe and ZnSe. Once these glasses are formed, they are subjected to a controlled annealing process at temperatures near the glass transition. During this long annealing process, the metal ions diffuse through the soft glass medium to form nanoparticles. The sizes of these nanoparticles are determined by the length of annealing. Presence of metal nanoparticles is expected to influence the luminescence properties of the dysprosium ions. Preliminary results from our study of the Dy-doped glass with CdSe and ZnSe NP's at 3mol% shows that there is an increase in fluorescence intensity in the 574nm wavelength when nanoparticles are present. With further investigations, we are hoping to better understand the relation between the metallic NPs and their interactions with the glass materials.